

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA IN INSTRUMENTATION & CONTROL**  
**SEMESTER- VI**

Subject Name: **ADVANCE PROCESS CONTROL**

Sr. No.	Subject Content	Hrs.	Pract. Hrs.
1	<b>1.0 PROCESS CONTROL &amp; AUTOMATION</b> 1.1 Introduction. 1.2 Continuous Process Control. 1.3 Discrete-state Process Control. 1.4 Composite Process Control. 1.5 Examples of Discrete-State Process Control	4	2
2	<b>2.0 PLC ARCHITECTURE:</b> 2.1 Introduction to PLC 2.2 Advantages of PLC over other conventional automation system 2.3 Types of PLCs 2.4 Principle of Operation 2.5 Architecture of PLC 2.5.1 Input Modules 2.5.2 Output Modules 2.5.3 Processor 2.5.4 Memory Unit 2.5.5 Programmer Unit 2.5.6 Power Supply Unit 2.6 Listing of PLC Peripherals and block diagram and brief description Of each blocks.	10	4
3	<b>3.0 PROGRAMMING THE PLC:</b> 3.1 Different types of Programming Languages like STL, CSF, Ladder. 3.2 Ladder Diagram 3.2.1 Ladder Diagram Elements 3.2.2 Symbols of Relays, Motors, Solenoids, Lights, Limit witches, Timer, Counter etc. 3.2.3 Development of Ladder Diagram for different Processes.  3.2.4 Programming of Industrial Controls using Timers & Counters Flag Programming , Logic gates etc.	10	10

	<p>3.3 PC-based Programmable Logic Controller.</p> <p>3.3.1 Introduction</p> <p>3.3.2 Block diagram</p> <p>3.3.3 Brief description of each block</p>		
4	<p><b>4.0 DISTRIBUTED CONTROL SYSTEM:</b></p> <p>4.1 Introduction.</p> <p>4.2 Evolution of DCS.</p> <p>4.3 Block diagram and brief description of following systems :</p> <p>4.3.1 Data Logger.</p> <p>4.3.2 Supervisory Control &amp; Data Acquisition System (SCADA)</p> <p>4.3.3 Direct Digital Control.</p> <p>4.4 Advantages of DCS in operation and safety.</p> <p>4.5 Functional Requirements of DCS.</p> <p>4.6 System Architecture of DCS.</p> <p>4.6.1 DCS I/O Hardware: Analog Input Module, Analog Output Module, Digital Input Module, Digital Output Module, CPU Module.</p> <p>4.6.2 Field Control Station</p> <p>4.6.3 Central Computer Station</p> <p>4.7 DCS – Network Topology</p> <p>4.8 DCS – CRT Display : Describe the salient features of the following</p> <p>4.8.1 Group / Overview Display</p> <p>4.8.2 Trend Display</p> <p>4.8.3 Mimic Display</p> <p>4.8.4 Report Generating Display</p> <p>4.8.5 History Display</p> <p>4.8.6 Alarm / Event Display</p> <p>4.9 An Industrial Control Application of DCS in cement plant.</p>	14	12
5	<p><b>5.0 INTRODUCTION TO INTELLIGENT CONTROL AND ARTIFICIAL INTELLIGENCE</b></p> <p>5.1 Features of Intelligent Control</p> <p>5.2 Definition of Artificial Intelligence</p> <p>5.3 Achievements and Future of Artificial Intelligence</p>	4	--
	<b>Total</b>	42	28

Note :-

1. **Two Industrial visits are recommended as a part of the syllabus**
2. **Above are the minimum experiences required, but the college can do more experiences if possible.**

Reference Books:

1. Process Control Instrumentation Technology - C. D. Johnson, PHI
2. Computer-Based Industrial Control - Krishna Kant, PHI
3. Process Control Principles And Applications – Surekha Bhanot (Oxford University Press)
4. Mechanical and Industrial Measurements - R. K. Jain, Khanna Publishers
5. Programmable Logic Controllers - W. G. Ottah